REMARKS

The Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and for the reasons that follow.

I. Amendments to the Claims

This amendment adds, changes and/or deletes claims in this application. A detailed listing of all claims that are, or were, in the application, irrespective of whether the claim(s) remain under examination in the application, is presented, with an appropriate defined status identifier.

Claims 1-23 are requested to be cancelled without disclaimer or prejudice thereof. The Applicants reserve the right to prosecute claims directed to the cancelled subject matter in this or another application.

Claims 24-34 are requested to be added. The newly added claims relate to the elected subject matter and SEQ ID NOs: 28 and 57. Support for the newly added claims is provided in the specification and claims as originally filed, in particular, at pages 8-11; 25-27; and Tables 1-4. The newly added claims do not introduce new matter and are requested to be entered.

After amending the claims as set forth above, claims 24-34 are now pending in this application.

II. Informalities

The Office Action dated January 23, 2006 asserts that the disclosure is objected to because of the following informalities.

A. The title "Human Transmembrane Proteins" is not descriptive, and "is not clearly indicative of the invention to which claims are directed." (Office Action dated January 23, 2006 at page 3, hereinafter "Office Action").

The Applicants respectfully disagree. New claims 24-34 are directed to **human transmembrane proteins** and polynucleotides which identify and encode **human transmembrane proteins**. Specifically, new claims 24-34, all of which relate to SEQ ID NOS: 28 and/or 57, are directed to particular polypeptides and polynucleotides (*e.g,* SEQ ID NOS: 28 and 57) having properties, motifs and characteristic of **transmembrane proteins**. Further, SEQ ID NOS: 57 and 28 were derived from a human.

First, the specification of Application No. 09/937,059 ("the '059 Application") describes Table 2 as showing "features of each polypeptide sequence, including potential motifs, homologous sequences...." ('059 Application at page 11). Column 5 of Table 2 shows "the amino acid residues comprising **signature sequences and motifs**." ('059 Application at page 25). SEQ ID NO 28 is presented in Table 2 and is noted to contain "**transmembrane motifs**." ('059 Application at page 69). Indeed, 28 of the 29 sequences presented in Table 2 exhibit a discernable **"transmembrane" domain or motif**.

Second, all of the sequences described in Tables 1-3, including SEQ ID NOS: 28 and 57, are from human samples. The specification notes that the "invention is based on the discovery of new **human** transmembrane proteins...." ('059 Application at page 25), and Table 4 column 3 describes the origin of the library polynucleotide SEQ ID NO: 57 (and therefore, SEQ ID NO: 28) as being from "a diseased ovary...from...a 39 year old Caucasian female...." ('059 Application at page 79).

Accordingly, the title "Human Transmembrane Proteins" is clearly indicative of the invention to which the claims are directed. The pending claims relate to SEQ ID NOS: 28 and 57 which were derived from a **human** and contain at least one **"transmembrane motif."**

B. The disclosure is objected to because it contains browser-executable codes. (January 23, 2006 Office action at page 3).

The amendment to the specification eliminates the browser-executable codes, thereby obviating this objection.

III. Claim Objections

Claims 4 and 10 are objected to for reciting non-elected inventions. Claims 4 and 10 have been cancelled thereby obviating the objection.

Claims 3 and 8 are objected to for depending from withdrawn independent claims. Claims 3 and 8 have been cancelled thereby obviating the objection.

IV. Claim Rejections – 35 U.S.C. § 101 and 35 U.S.C. § 112, Utility and Enablement

Claims 3-6, 8, 10 and 11 stand rejected under 35 U.S.C. § 101 and 35 U.S.C. § 112, first paragraph, allegedly "because the claimed invention lacks specific and substantial asserted utility or a well-established utility." (Office Action at page 4). Claims 3-6, 8, 10 and 11 have been cancelled thereby obviating the rejection. New claims 24-34 fully comply with 35 U.S.C. §§ 101 and 112, first paragraph, for the following reasons.

The Office Action asserts that the specification lists six utilities for the claimed invention, and proceeds to explain why each of the six is allegedly not "substantial," "specific" or "credible." (Office Action at pages 4-5). All six of the listed utilities are related to use of the invention claimed in new claims 24-34, and relate to SEQ ID NO: 28 and/or SEQ ID NO: 57. The specification supports substantial, specific and credible utility for the claimed SEQ ID NOS: 28 and 57.

Although an invention may have numerous uses, an applicant for a patent need only support one utility (*see e.g.*, MPEP § 2107, describing examination guidelines for "**a** well-established" utility) to obtain a patent. Accordingly, the first utility cited in the Office Action list will be used as an example to demonstrate that the specification supports a credible, substantial and specific utility for the claimed invention.

The Office Action notes that one utility asserted in the specification, the production of polypeptide fragments, is "**credible** and **substantial**, but **not specific**." (Office Action at pages 4, 5). The Office Action asserts that "[m]any nucleotides sequences can be used to make polypeptides," and also asserts that "if the Disclosure discloses **nothing specific and substantial about the polynucleotides or polypeptides**, both the polynucleotides and polypeptides produced have no patentable utility." *Id.* The Applicants respectfully disagree; the disclosure discloses specific and substantial information about the polypeptides, and consequently about the polynucleotides that encode them.

First, the specification at Table 2 shows that SEQ ID NO: 28 contains three distinct and recognizable (specific and substantial) motifs: a leucine zipper gene regulatory pattern, a signal peptide, and a transmembrane motif. ('059 Application at page 69, Table 2, Col. 5). Accordingly, the corresponding polynucleotide sequence SEQ ID NO: 57 encodes a leucine zipper gene regulatory pattern, a signal peptide, and a transmembrane motif. The function of each of these domains is well known in the art.

Second, Table 3 shows "the tissue-specificity and diseases, disorders, or conditions associated with the nucleotide sequences encoding the [human transmembrane proteins] HTMP." More specifically, column 3 of Table 3 lists tissue categories which express the HTMP sequence as a fraction of total tissues expressing HTMP. ('059 Application at page 73). That is, 40% of the tissues in which SEQ ID NO: 57 was expressed were gastrointestinal and 20% were reproductive. Further, Table 3, column 4 "lists diseases, disorders, or conditions associated with those tissues expressing HTMP." Table 3, column 4 shows that SEQ ID NO: 57 is correlated with cancer (56%), inflammation (24%) and cell proliferation (12%) in gastrointestinal and reproductive tissue. *Id.* Accordingly, it is disclosed and asserted that SEQ ID NO: 57 and corresponding SEQ ID NO: 28 are expressed in cancerous, inflamed or aberrantly proliferative gastrointestinal or reproductive tissue.

Thus, the specification discloses **specific and substantial** information about the polypeptides and the polynucleotides. The specification discloses and asserts that SEQ ID NOs: 28 and 57 are expressed in gastrointestinal and reproductive tissue; that they are expressed in cancerous, inflamed, and aberrantly proliferative gastrointestinal or reproductive tissue; and that they encode a leucine zipper gene regulatory pattern, a signal peptide, and a transmembrane motif. As such, the first cited utility, the production of HTMP polypeptide(s) and fragments is credible, substantial and specific, and one of ordinary skill in the art would immediately appreciate the usefulness of the claimed invention.

For example, the production of peptides and peptide fragments related to SEQ ID NO: 28 would enable the production of antibodies specific for these fragments. The antibodies could then be used to detect cancerous, inflamed or aberrantly proliferative gastrointestinal and reproductive tissues (*e.g*, tissue typing may be performed), whereupon appropriate treatment to alleviate such symptoms could begin.

For at least these reasons, a utility for the claimed subject matter is disclosed and asserted. Reconsideration and withdrawal of the rejection under 35 U.S.C. § 101 for lack of utility is requested.

V. Claim Rejections – 35 U.S.C. § 112, first paragraph, "Enablement"

Claims 3-6, 8, 10 and 11 stand rejected under 35 U.S.C. § 112, first paragraph. Claims 3-6, 8, 10 and 11 have been cancelled, thereby obviating the rejection. New claims 24-34 fully comply with the requirements of 35 U.S.C. § 112 for the following reasons.

The Office Action asserts that "since the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility ... one skilled in the art clearly would not know how to use the claimed invention." (Office Action at page 7). The Office Action further asserts that, due to an alleged lack of utility, the "Disclosure does not teach the skilled artisan how to use the claimed polynucleotides encoding HTMP for any purpose," (*id.* at page 8) that there is insufficient information to "provide enablement...to make the invention commensurate in scope with these claims," (*id.* at page 9) and that due to a "lack of direction/guidance...[and] the absence of working examples...and unpredictability in the art" undue experimentation would be necessary by one of ordinary skill to make and use the claimed invention. *Id.* Additionally, the Office Action asserts that "the Disclosure does not teach functional or structural characteristics of the polynucleotide or HTMP polypeptide recited in the claims," and further cites references regarding correlations between protein structure and function. (*Id.* at page 7). Further, due to the alleged lack of utility, the Office Action asserts that "there is no disclosure of particular disease states correlating to an alteration in levels or forms of the polypeptides such that the claimed polynucleotides encoding HTMP could be used as a diagnostic tool." (*Id.* at page 8). The Applicants respectfully disagree and traverse the rejection.

As noted above, the specification discloses and asserts a specific and substantial utility such that one of ordinary skill in the art would clearly understand how to make and use the claimed invention. Accordingly, the claimed invention is enabled. Moreover, the specification details and teaches methods of using these sequences for numerous purposes and includes a detailed description of how to use the claimed invention for diagnostic and therapeutic purposes. (*See e.g.*, '059 Application at pages 35-50). Additionally, the Experimental Examples Section details specific, exemplary methods which teach the use of the polynucleotides and polypeptides of the present invention for a variety of purposes. (*See e.g.*, '059 Application at sections VII – XV, pages 56-61 which teach labeling and use of individual hybridization probes; construction and use of microarrays; use of complementary polynucleotides; protein expression; activity assays; functional assays; production of antibodies; purification of naturally occurring antibodies; and identification of molecules which interact). Accordingly, the specification is enabled and one of ordinary skill in the art

would understand, from the specification as filed, how to make and used the claimed invention without undue experimentation.

Next, the Disclosure teaches functional and structural characteristics of the HTMP polypeptide recited in the claims, SEQ ID NO: 28. Tables 3 and 4 disclose and assert that SEQ ID NO: 28 and SEQ ID NO: 57 (which encodes SEQ ID NO: 28) are expressed in gastrointestinal and reproductive tissue; that they are expressed in cancerous, inflamed, and aberrantly proliferative gastrointestinal or reproductive tissue; and that they encode a leucine zipper regulatory pattern, a signal peptide, and a transmembrane motif, the function and characteristics of which are known in the art.

Finally, the Office Action asserts that "there is no disclosure of particular disease states correlating to an alteration in levels or forms of the polypeptides such that the claimed polynucleotides encoding HTMP could be used as a diagnostic tool." (Office Action at page 8). Again, the Applicants respectfully disagree. Tables 3 discloses and asserts that SEQ ID NO: 57 is present in **cancerous**, **inflamed,** and **aberrantly proliferative gastrointestinal or reproductive tissue,** and Table 4 discloses and asserts that SEQ ID NO: 57 (and consequently, SEQ ID NO: 28) were derived from "diseased ovary tissue," and that "pathology indicated the right and left adnexa were extensively involved by endometriosis." ('059 Application at page 73, 79). Endometriosis can be characterized as a disease in which **abnormal tissue grows** in the abdomen, it is associated with **reproductive tissue**, it is **similar to cancer**, and it can cause **inflammation**. Accordingly, one of skill in the art, after reviewing the specification, would reasonably correlate the presence of SEQ ID NOS: 28 and 57 or fragments thereof with inflammation, abnormal or aberrantly proliferative tissue, or cancer in abdominal (*e.g.*, reproductive or gastrointestinal) tissue.

For at least the reasons stated above, reconsideration and withdrawal of the rejection under 35 U.S.C. § 112, first paragraph, for lack of enablement, are requested.

VI. Claims Rejections – 35 U.S.C. § 112, first paragraph, "Written Description"

Claims 3-6, 8, 10 and 11 stand rejected under 35 U.S.C. § 112, first paragraph, written description requirement. Claims 3-6, 8, 10 and 11 have been cancelled, thereby obviating the rejection. New claims 24-34 fully comply with the written description requirements of 35 U.S.C. § 112, first paragraph.

The Office Action alleges that the cancelled claims "contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor, at the time the application was filed, had possession of the claimed invention." (Office Action at page 9-10).

The Office Action directs the rejection specifically to the claim limitation reciting **"isolated nucleic acids having at least 90% sequence identity to a nucleic acid encoding the polypeptide of SEQ ID NO: 28 or large fragments of SEQ ID NO: 57."** (Office Action at page 10). The Office Action further asserts that "the specification does not teach functional or structural characteristics of all claimed polynucleotides," and that the "description of one polynucleotide encoding an HTMP polypeptide (SEQ ID NO: 28) is not adequate written description of an entire genus of functionally equivalent polynucleotides and polypeptides." (*Id.* at page 11). The Office Action concludes by asserting that "only an isolated nucleic acid molecule comprising the nucleotide sequence of SEQ ID NO: 57 and a polypeptide comprising the amino acid sequence of SEQ ID NO: 28 ... meet the written description ... of 35 U.S.C. § 112, first paragraph." *Id.* The Applicants respectfully disagree.

First, claims containing the above-noted limitation (*i.e.*, "isolated nucleic acids having at least 90% sequence identity to a nucleic acid encoding the polypeptide of SEQ ID NO: 28 or large fragments of SEQ ID NO: 57") have been cancelled. New claim 24 recites as follows:

"24. (New) An isolated polynucleotide encoding a polypeptide comprising an amino acid sequence having at least about 95% sequence identity to an amino acid sequence of SEQ ID NO: 28."

Second, it is well known that an amino acid sequence can be encoded by a variety of codons. Hence, identical polypeptide sequences may be generated via different nucleotide sequences. The court in *In re Wallach* agreed with this understanding and conveyed that "the state of the art has developed such that the complete amino acid sequence of a protein may put one in possession of the genus of DNA sequences encoding it." *In re Wallach*, 378 F.3d 1330, 1333-34 (Fed. Cir. 2004). The court also cited section 2163 of the Manual of Patent Examining Procedure, which states that "a disclosure of an amino acid sequence would provide sufficient information such that one would accept that an applicant was in possession of the full genus of nucleic acids encoding a given amino acid sequence." *See* Manual of Patent Examining Procedure, § 2163.II.A.3.a.ii (8th ed., rev. 3, 2005). Finally, the court concluded that there is "no reason to require a patent applicant to list every possible permutation of the nucleic acid sequences that that can encode a particular protein for which the amino acid sequence is disclosed." *In re Wallach*, 378 F.3d 1330, 1334.

For these reasons, reconsideration and withdrawal of the rejection under 35 U.S.C. § 112, first paragraph, for inadequate written description, are requested.

VII. Conclusion

The present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741.

If any extensions of time are needed for timely acceptance of papers submitted herewith, the Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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